A MULTI-DISCIPLINARY STUDY OF THE 2002-03 ETNA ERUPTION: INSIGHTS INTO A COMPLEX PLUMBING SYSTEM

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The 2002-03 Mt Etna flank eruption began on 26 October and finished on 28 January 2003, after three months of continuous explosive activity and discontinuous lava flow output. The eruption involved the opening of eruptive fissures on the NE and S flanks of the volcano, with lava flow output and fire fountaining until 5 November. After this date, the eruption continued exclusively on the S flank, with continuous explosive activity and lava flows active between 13 November and 28 January 2003. Multi-disciplinary data collected during the eruption (petrology, analyses of ash components, gas geochemistry, field surveys, thermal mapping and structural surveys) allowed us to analyse the dynamics of the eruption. The eruption was triggered either by (i) accumulation and eventual ascent of magma from depth or (ii) depressurisation of the edifice due to spreading of the eastern flank of the volcano. The extraordinary explosivity makes the 2002-03 eruption a unique event in the last 300 years, comparable only with La Montagnola 1763 and the 2001 Lower Vents eruptions. A notable feature of the eruption was also the simultaneous effusion of lavas with different composition and emplacement features. Magma erupted from the NE fissure represented the partially degassed magma fraction normally residing within the central conduits and the shallow plumbing system. Magma erupted from the S fissure was the relatively undegassed, volatile-rich, buoyant fraction which drained the deep feeding system, bypassing the central conduits. This is typical for most Etnean eccentric eruptions. We believe that there is a high probability that Mt Etna has entered a new eruptive phase, with supply of magma to a deep reservoir independent from the central conduit, that

could periodically produce sufficient overpressure to propagate a dyke to the surface and generate further flank eruptions.